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P-BAR NOTE # 438

EMERGENCY PROCEDURES FOR DROPPED, STUCK OR DAMAGED TARGET STATION MODULES AND FOR CRANE FAILURE WHILE HANDLING RADIOACTIVE COMPONENTS

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This note describes considerations for a safe method of repairing, removing, and storing damaged or stuck modules and repairing crane failures to minimize personnel radiation exposure and maximize personnel safety.

> The Accelerator Safety Officer and the Engineer in Charge must be notified immediately if an accident occurs. They must review and approve any corrective procedures before implementation. If a crane failure occurs, also notify Facility Operations and Engineering (F0 & E) extension 3469.

I. TORNADO WARNING

The overhead crane shall not be operated to handle radioactive components during a tornado watch. Radioactive components shall be placed in the target pit or storage vault during a tornado watch. Please note, during inclement weather, the crane operator will call the operator to determine if a tornado watch is in effect. (There is no notification during a tornado watch).

II. DROPPED MODULE

The possibility of a dropped module is remote since large safety factors have been used in all lifting fixtures. However we must consider procedures for any type of accident. Some of the types are as follows:

A. Lifting fixture breaks as the module is lifted from the target vault. (The likely damage and procedures will vary as the distance that the module falls.)

1. The module falls a few inches. Little or no damage should occur, but careful examination should be made before attempting removal. Examine the failed lifting fixture carefully and correct the problem by design changes or procedure changes before repairing. Remove an adjacent shielding module block and examine the components mounted to the bottom of the dropped block using a TV camera or a mirror. Personnel shall not crawl down into the target vault.

   After careful examination and correction, remove the module in the standard way.

2. The module falls several feet. Carefully examine the module as in Step 1. If the top plate bolts are broken, they must be replaced to allow use of the repaired lifting fixture. If the bottom components are loose, appropriate steps must be taken to release power leads or water lines before lifting the module block. A loose lens and transformer can be lifted from the pit with sling loops, weight is minimal. A loose pulsed magnet can be lifted by slings or a lifting fixture. Slings or lifting fixtures must be manipulated from the top level of the modules to reduce radiation exposure. After removal from the pit, components can be placed in the coffins or in the storage pit.

3. The module falls after it is removed from the pit. The tall, narrow module will tip over if the lifting fixture fails and drops the module to the floor. Portable lead shields and blankets can be used to cover the radioactive bottom components to allow personnel to attach heavy duty lifting eyebolts to the top of the module. Slings can then be used to lift the module to the alcove for disassembly and repair.

III. STUCK MODULE

A. A module can become stuck if equipment, parts, or filler plates fall between modules. Most of these items can be removed by moving or removing adjacent module blocks. If a module is dropped and gets cocked between support rails, more stringent procedures must be followed. First, block the module with timbers that are secured in place to prevent slippage when the crane is released. Then, attach heavy duty slings to the top of the module in such a way as to release the binding forces and lift the module to the alcove. Use the dynamometer to eliminate excessive lifting forces when trying to free a stuck module.

IV. CRANE FAILURE

There are several possibilities for crane failure while handling radioactive components. The Accelerator Safety Officer and Engineer in Charge shall review the Repair Parts & Maintenance Manual with work central personnel to make sure proper procedures are followed. There can be mechanical failures as well as electrical failures:

A. Lifting hoist brake problems. A description of and maintenance/repair procedures for the hoist brake are covered in Service Bulletin 5010-10 in the "Repair Parts & Maintenance Manual Section III. F0 and E has a copy of this manual and a copy is also kept in the target hall file cabinet. The brake has a manual release to allow personnel to lower a module to the alcove rails storage pit or target vault before attempting repair. The brake is on the trolley, so a repairman does not have to get close to the module to release the brake.

B. Lifting motor fails. If the module has not been lifted from the pit, repairmen can safely make repairs. If the radioactive component is above floor level two options are available. Either manually release the lifting drum brake to allow the module to go down in the pit, or place portable shielding around the component to allow repairs. The motor is several feet above any component, so the module can also be moved near shielding blocks to lower radiation levels and allow repairmen to work on the motor.

C. Trolley or bridge travel motor fails. The trolley and bridge can be physically moved by manually releasing the brake and then using ropes pulled by personnel on the floor. Refer to the maintenance manual for proper procedure. An alternative to this is to manually rotate the wheel driveshafts until the module can be lowered to the pit. The radioactive component will be behind the shielding walls, so personnel will not be exposed to radiation while moving the trolley.

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